

# Assessment of Groundwater Quality for Irrigation in Chittoor District of Andhra Pradesh

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## ABSTRACT

A survey was undertaken during the year 2019 to assess the quality of groundwater for irrigation in various mandals of Chittoor district, Andhra Pradesh. A total of 358 water samples were collected from 66 mandals of Chittoor district and GPS location of sampling points were recorded. The water samples were analyzed for various chemical properties viz., pH, EC, Ca<sup>2+</sup>, Mg<sup>2+</sup>, Na<sup>+</sup> and K<sup>+</sup>; CO<sub>3</sub><sup>2-</sup>, HCO<sub>3</sub><sup>-</sup>, Cl<sup>-</sup> & SO<sub>4</sub><sup>2-</sup>. Accordingly the groundwater was classified into various classes based on the guidelines given by United States Salinity Laboratory (USSL) by computing ion composition into EC, RSC and SAR. The irrigation water samples of Chittoor district was classified into 7 classes viz., C1S2, C2S1, C3S1, C3S2, C4S1, C4S2 and C4S3. Out of 358 water samples 2 (0.55%) are under C1S2 class, 18 (5.02%) under C2S1 class, 271 (75.69%) under C3S1, 2 (0.55%) under C3S2, 62 (17.31%) is under C4S1, 2 (0.55%) under C4S2 and 1 (0.27%) under C4S3 class. Among the 66 mandals of Chittoor district highest mean pH (7.78) of groundwater was recorded in Pulicherla mandal with a range varied 7.2-8.8 and lowest was with Satyavedu (pH 6.18) with varied pH 5.5-6.4. Highest mean EC (4.26 dSm<sup>-1</sup>) from 1.9-13.5 dSm<sup>-1</sup> was reported in KVB Puram mandal and lowest was recorded with Satyavedu mandal (EC : 0.4 dSm<sup>-1</sup>) with a range from 0.3-0.5 dSm<sup>-1</sup>. The mean Residual Sodium Carbonate (RSC) was high (2.72 me L<sup>-1</sup>) in Ramachandrapuram mandal and lowest (-9.84 me L<sup>-1</sup>) was recorded in Nindra mandal. The highest mean Sodium Adsorption Ratio (SAR) of groundwater was reported with KVB Puram mandal (8.37) and lowest noticed in Satyavedu mandal (0.49). The ground water quality of mandals viz., Vadamalapeta, Tirupati urban, vedurukuppam, Satyavedu, Yerravaripalem, Kalakada, Madhanapalli, Nimmanapalli, Thambalapalli, Chandragiri, Kuppam, Ramakuppam, V.Kothakota, S.R. Puram, Irala, Pakala, Gangavaram, Ramasamudram and Peddapanjari of Chittoor were in good quality and can be used safely for irrigation.

**Keywords:** EC, Groundwater quality, RSC and SAR.